

PROCEEDINGS

OF THE

Indiana Academy of Science

1918

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LEE F. BENNETT, EDITOR

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INDIANAPOLIS:

WM. B. BURFORD, CONTRACTOR FOR STATE PRINTING AND BINDING

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# CONSTITUTION.

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## ARTICLE I.

SECTION 1. This association shall be called the Indiana Academy of Science.

SEC. 2. The objects of this Academy shall be scientific research and the diffusion of knowledge concerning the various departments of science; to promote intercourse between men engaged in scientific work, especially in Indiana; to assist by investigation and discussion in developing and making known the material, educational and other resources and riches of the State; to arrange and prepare for publication such reports of investigation and discussion as may further the aims and objects of the Academy as set forth in these articles.

WHEREAS, The State has undertaken the publication of such proceedings, the Academy will, upon request of the Governor, or one of the several departments of the State, through the Governor, act through its council as an advisory body in the direction and execution of any investigation within its province as stated. The necessary expenses incurred in the prosecution of such investigation are to be borne by the State; no pecuniary gain is to come to the Academy for its advice or direction of such investigation.

The regular proceedings of the Academy as published by the State shall become a public document.

## ARTICLE II.

SECTION 1. Members of this Academy shall be honorary fellows, fellows, non-resident members, and active members.

SEC. 2. Any person engaged in any department of scientific work, or in any original research in any department of science, shall be eligible to active membership. Active members may be annual or life members. Annual members may be elected at any meeting of the Academy; they shall sign the constitution, pay an admission fee of two dollars and thereafter an annual fee of one dollar. Any person who shall at one time contribute fifty dollars to the funds of this Academy may be elected a life member of the Academy, free of assessment. Non-resident members may be elected from those who have been active members but who have removed from the State. In any case, a three-fourths vote of the members present shall elect to membership. Application for membership in

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any of the foregoing classes shall be referred to a committee on application for membership, who shall consider such application and report to the Academy before the election.

SEC. 3. The members who are actively engaged in scientific work, who have recognized standing as scientific men, and who have been members of the Academy at least one year, may be recommended for nomination for election as fellows by three fellows or members personally acquainted with their work and character. Of members so nominated a number not exceeding five in one year may, on recommendation of the Executive Committee, be elected as fellows. At the meeting at which this is adopted, the members of the Executive Committee for 1894 and fifteen others shall be elected fellows, and those now honorary members shall become honorary fellows. Honorary fellows may be elected on account of special prominence in science, on the written recommendation of two members of the Academy. In any case a three-fourths vote of the members present shall elect.

### ARTICLE III.

SECTION 1. The officers of this Academy shall be chosen by ballot at the annual meeting, and shall hold office one year. They shall consist of a President, Vice-President, Secretary, Assistant Secretary, Press Secretary, Editor, and Treasurer, who shall perform the duties usually pertaining to their respective offices and in addition, with the ex-Presidents of the Academy, shall constitute an Executive Committee. The President shall, at each annual meeting, appoint two members to be a committee which shall prepare the programs and have charge of the arrangements for all meetings for one year.

SEC. 2. The annual meeting of the Academy shall be held in the city of Indianapolis within the week following Christmas of each year, unless otherwise ordered by the Executive Committee. There shall also be a summer meeting at such time and place as may be decided upon by the Executive Committee. Other meetings may be called at the discretion of the Executive Committee. The past Presidents, together with the officers and Executive Committee, shall constitute the council of the Academy, and represent it in the transaction of any necessary business not especially provided for in this constitution, in the interim between general meetings.

SEC. 3. This constitution may be altered or amended at any annual meeting by a three-fourths majority of the attending members of at least one year's standing. No question of amendment shall be decided on the day of its presentation.

BY-LAWS.

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1. On motion, any special department of science shall be assigned to a curator, whose duty it shall be, with the assistance of the other members interested in the same department, to endeavor to advance knowledge in that particular department. Each curator shall report at such time and place as the Academy shall direct. These reports shall include a brief summary of the progress of the department during the year preceding the presentation of the report.

2. The President shall deliver a public address on the morning of one of the days of the meeting at the expiration of his term of office.

3. The Press Secretary shall attend to the securing of proper newspaper reports of the meetings and assist the Secretary.

4. No special meeting of the Academy shall be held without a notice of the same having been sent to the address of each member at least fifteen days before such meeting.

5. No bill against the Academy shall be paid without an order signed by the President and countersigned by the Secretary.

6. Members who shall allow their dues to remain unpaid for two years, having been annually notified of their arrearage by the Treasurer, shall have their names stricken from the roll.

7. Ten members shall constitute a quorum for the transaction of business.

8. An Editor shall be elected from year to year. His duties shall be to edit the annual Proceedings. No allowance shall be made to the Editor for clerical assistance on account of any one edition of the Proceedings in excess of fifty (\$50) dollars, except by special action of the Executive Committee. (Amendment passed December 8, 1917.)

AN ACT TO PROVIDE FOR THE PUBLICATION OF THE  
REPORTS AND PAPERS OF THE INDIANA  
ACADEMY OF SCIENCE.

(Approved March 11, 1895.)

WHEREAS, The Indiana Academy of Science, a chartered scientific association, has embodied in its constitution a provision that it will, upon the request of the Governor, or of the several departments of the State government, through the Governor, and through its council as an advisory board, assist in the direction and execution of any investigation within its province without pecuniary gain to the Academy, provided only that the necessary expenses of such investigation are borne by the State; and,

WHEREAS, The reports of the meetings of said Academy, with the several papers read before it, have very great educational, industrial and economic value, and should be preserved in permanent form; and,

WHEREAS, The Constitution of the State makes it the duty of the General Assembly to encourage by all suitable means intellectual, scientific and agricultural improvement; therefore,

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That hereafter the annual reports of the meetings of the Indiana Academy of Science, beginning with the report for the year 1894, including all papers of scientific or economic value, presented at such meetings, after they shall have been edited and prepared for publication as hereinafter provided, shall be published by and under the direction of the Commissioners of Public Printing and Binding.

SEC. 2. Said reports shall be edited and prepared for publication without expense to the State, by a corps of editors to be selected and appointed by the Indiana Academy of Science, who shall not, by reason of such service, have any claim against the State for compensation. The form, style of binding, paper, typography and manner and extent of illustration of such reports shall be determined by the editors, subject to the approval of the Commissioners of Public Printing and Stationery. Not less than 1,500 nor more than 3,000 copies of each of said reports shall be published, the size of the edition within said limits to be determined by the concurrent action of the editors and the Commissioners of Public Printing and Stationery: *Provided,* That not to exceed six hundred dollars (\$600) shall be expended for such publication in any one year, and not to extend beyond 1896: *Provided,* That no sums shall be deemed to be appropriated for the year 1894.

SEC. 3. All except three hundred copies of each volume of said reports shall be placed in the custody of the State Librarian, who shall

furnish one copy thereof to each public library in the State, one copy to each university, college or normal school in the State, one copy to each high school in the State having a library, which shall make application therefor, and one copy to such other institutions, societies or persons as may be designated by the Academy through its editors or its council. The remaining three hundred copies shall be turned over to the Academy to be disposed of as it may determine. In order to provide for the preservation of the same it shall be the duty of the Custodian of the State House to provide and place at the disposal of the Academy one of the unoccupied rooms of the State House, to be designated as the office of the Academy of Science, wherein said copies of said reports belonging to the Academy, together with the original manuscripts, drawings, etc., thereof can be safely kept, and he shall also equip the same with the necessary shelving and furniture.

SEC. 4. An emergency is hereby declared to exist for the immediate taking effect of this act, and it shall therefore take effect and be in force from and after its passage.

#### PUBLIC OFFENSES—HUNTING WILD BIRDS—PENALTY.

(Approved March 15, 1913.)

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That section six (6) of the above entitled act be amended to read as follows: Section 6. That section six hundred two (602) of the above entitled act be amended to read as follows: Section 602. It shall be unlawful for any person to kill, trap or possess any wild bird, or to purchase or offer the same for sale, or to destroy the nest or eggs of any wild bird, except as otherwise provided in this section. But this section shall not apply to the following named game birds: The Anatidae, commonly called swans, geese, brant, river and sea duck; the Rallidae, commonly known as rails, coots, mud-hens and gallinules; the Limicolae, commonly known as shore birds, plovers, surf birds, snipe, woodcock, sandpipers, tattlers and curlews; the Gallinae, commonly called wild turkeys, grouse, prairie chickens, quails, and pheasants; nor to English or European house sparrows, blackbirds, crows, hawks or other birds of prey. Nor shall this section apply to any person taking birds or their nests or eggs for scientific purposes under permit as provided in the next section. Any person violating the provisions of this section shall, on conviction, be fined not less than ten dollars (\$10.00) nor more than fifty dollars (\$50.00).

## INDIANA ACADEMY OF SCIENCE.

## OFFICERS, 1919.

*President,*

E. B. WILLIAMSON.

*Vice-President,*

CHARLES STOLTZ.

*Secretary,*

HOWARD E. ENDERS.

*Assistant Secretary,*

PHILIP A. TETRAULT.

*Press Secretary,*

FRANK B. WADE.

*Treasurer,*

WILLIAM M. BLANCHARD.

*Editor,*

LEE F. BENNETT.

*Executive Committee:*

ARTHUR, J. C.,	DRYER, CHAS. R.,	MENDENHALL, T. C.,
BENNETT, L. F.,	EIGENMANN, C. H.,	NAYLOR, JOSEPH P.,
BIGNEY, A. J.,	ENDERS, HOWARD E.,	NOYES, W. A.,
BLANCHARD, W. M.,	EVANS, P. N.,	STOLTZ, CHARLES,
BLATCHLEY, W. S.,	FOLEY, A. L.,	TETRAULT, P. A.,
BRANNER, J. C.,	HAY, O. P.,	WADE, F. B.,
BURRAGE, SEVERANCE,	HESSLER, ROBERT,	WALDO, C. A.,
BUTLER, AMOS W.,	JORDAN, D. S.,	WILEY, H. W.,
COGSHALL, W. A.,	MCBETH, W. A.,	WILLIAMSON, E. B.,
COULTER, JOHN M.,	MEES, CARL L.,	WRIGHT, JOHN S.
COULTER, STANLEY,	MOENKHAUS, W. J.,	
CULBERTSON, GLENN,	MOTTIER, DAVID M.,	

*Curators:*

BOTANY.....	J. C. ARTHUR.
ENTOMOLOGY.....	W. S. BLATCHLEY.
HERPETOLOGY	}.....A. W. BUTLER.
MAMMALOLOGY	
ORNITHOLOGY	
ICHTHYOLOGY.....	C. H. EIGENMANN.

## COMMITTEES ACADEMY OF SCIENCE, 1919.

*Program.*

C. C. DEAM, Bluffton.  
 FRANK B. WADE, Shortridge High  
 School, Indianapolis.  
 JOHN S. WRIGHT, Indianapolis.

*Nominations.*

STANLEY COULTER, Lafayette.  
 W. J. MOENKHAUS, Bloomington.  
 J. P. NAYLOR, Greencastle.

*State Library.*

W. S. BLATCHLEY, 1558 Park Ave.,  
 Indianapolis.  
 A. L. FOLEY, Bloomington.  
 AMOS W. BUTLER, State House,  
 Indianapolis.

*Biological Survey.*

HERBERT S. JACKSON, Agricultural  
 Experiment Station, West La-  
 fayette.  
 RICHARD M. HOLMAN, Crawfords-  
 ville.  
 M. S. MARKLE, Richmond.  
 WILL SCOTT, Indiana University,  
 Bloomington.

*Distribution of Proceedings.*

HOWARD E. ENDERS, West Lafay-  
 ette.  
 WM. M. BLANCHARD, Greencastle.  
 U. O. COX, State Normal, Terre  
 Haute.  
 GEORGE OSNER, West Lafayette.

*Membership.*

F. M. ANDREWS, Bloomington.  
 M. L. FISHER, West Lafayette.  
 MASON L. WEEMS, Valparaiso.

*Auditing.*

GLENN CULBERTSON, Hanover.  
 ROLLO RAMSEY, Bloomington.

*Relation of the Academy to the  
State.*

R. W. MCBRIDE, 1239 State Life  
 Building, Indianapolis.  
 GLENN CULBERTSON, Hanover.  
 H. E. BARNARD, State House, Indi-  
 anapolis.  
 JOHN S. WRIGHT, 3718 Pennsyl-  
 vania St., Indianapolis.  
 W. W. WOOLLEN, 1628 Pennsyl-  
 vania St., Indianapolis.

*Publication of Proceedings.*

LEE F. BENNETT, Janesville, Wis.  
 ROBERT HESSLER, Logansport.  
 GEORGE N. HOFFER, West Lafayette.  
 R. R. HYDE, Terre Haute.  
 JAMES BROWN, 5372 E. Washington  
 St., Indianapolis.

*Advisory Council.*

JOHN S. WRIGHT.  
 R. W. MCBRIDE.  
 GLENN CULBERTSON.  
 STANLEY COULTER.  
 WILBUR COGSHALL.

OFFICERS OF THE INDIANA ACADEMY OF SCIENCE.

YEARS.	PRESIDENT.	SECRETARY.	ASST. SECRETARY.	PRESS SECRETARY.	TREASURER.
1885-1886	David S. Jordan	Amos W. Butler			O. P. Jenkins.
1886-1887	John M. Coulter	Amos W. Butler			O. P. Jenkins.
1887-1888	J. P. D. John*	Amos W. Butler			O. P. Jenkins.
1888-1889	John C. Brauner	Amos W. Butler			O. P. Jenkins.
1890-1890	T. C. Mendenhall	Amos W. Butler			O. P. Jenkins.
1890-1891	O. P. Hay	Amos W. Butler			O. P. Jenkins.
1891-1892	J. L. Campbell*	Amos W. Butler			C. A. Waldo.
1892-1893	J. C. Arthur	Amos W. Butler	Stanley Coulter W. W. Norman		C. A. Waldo.
1893-1894	W. A. Noyes	C. A. Waldo	W. W. Norman		W. P. Shannon.
1894-1895	A. W. Butler	John S. Wright	A. J. Bigney		W. P. Shannon.
1895-1896	Stanley Coulter	John S. Wright	A. J. Bigney		W. P. Shannon.
1896-1897	Thomas Gray*	John S. Wright	A. J. Bigney		W. P. Shannon.
1897-1898	C. A. Waldo	John S. Wright	A. J. Bigney	Geo. W. Benton	J. T. Scovell.*
1898-1899	C. H. Eigenmann	John S. Wright	E. A. Schultze	Geo. W. Benton	J. T. Scovell.
1899-1900	D. W. Dennis*	John S. Wright	E. A. Schultze	Geo. W. Benton	J. T. Scovell.
1900-1901	M. B. Thomas*	John S. Wright	E. A. Schultze	Geo. W. Benton	J. T. Scovell.
1901-1902	Harvey W. Wiley	John S. Wright	Donaldson Bodine*	Geo. W. Benton	J. T. Scovell.
1902-1903	W. S. Batchley	John S. Wright	Donaldson Bodine*	G. A. Abbott	W. A. McBeth.
1903-1904	C. L. Mees	John S. Wright	J. H. Ransom	G. A. Abbott	W. A. McBeth.
1904-1905	John S. Wright	Lynn B. McMullen	J. H. Ransom	G. A. Abbott	W. A. McBeth.

1905-1906	Robert Hessler .....	Lynn B. McMullen.	J. H. Ransom .....	Charles R. Clark...	W. A. McBeth.
1906-1907	D. M. Mottier .....	Lynn B. McMullen.	J. H. Ransom .....	G. A. Abbott .....	W. A. McBeth.
1907-1908	Glenn Culbertson .....	J. H. Ransom .....	A. J. Bigney .....	G. A. Abbott .....	W. A. McBeth.
1908-1909	A. L. Foley .....	J. H. Ransom .....	A. J. Bigney .....	G. A. Abbott .....	W. A. McBeth.
1909-1910	P. N. Evans .....	Geo. W. Benton .....	A. J. Bigney .....	John W. Woodhams	W. J. Moenkhaus.
1910-1911	C. R. Dryer .....	A. J. Bigney .....	E. B. Williamson..	Milo H. Stuart .....	W. J. Moenkhaus.
1911-1912	J. P. Naylor .....	A. J. Bigney .....	E. B. Williamson..	Milo H. Stuart .....	W. J. Moenkhaus.
1912-1913	Donaldson Bodine*...	A. J. Bigney .....	C. M. Smith .....	F. B. Wade .....	W. J. Moenkhaus.
1913-1914	Severance Burrage .....	A. J. Bigney .....	Howard E. Enders	F. B. Wade .....	W. A. Cogshall.
1914-1915	Wilbur A. Cogshall...	A. J. Bigney .....	Howard E. Enders.	F. B. Wade .....	Wm. M. Blanchard.
1915-1916	A. J. Bigney .....	Howard E. Enders.	E. B. Williamson..	F. B. Wade .....	Wm. B. Blanchard.
1916-1917	W. J. Moenkhaus .....	Howard E. Enders.	P. A. Tetrault .....	F. B. Wade .....	Wm. M. Blanchard.
1917-1918	E. B. Williamson .....	Howard E. Enders.	P. A. Tetrault .....	F. B. Wade .....	Wm. M. Blanchard.
†1918-1919	E. B. Williamson .....	Howard E. Enders.	P. A. Tetrault .....	F. B. Wade .....	Wm. M. Blanchard.

\*Deceased. †Officers continued—Annual meeting not held because of influenza epidemic.

MEMBERS.\*

FELLOWS.

- Andrews, F. M., 901 E. 10th St., Bloomington.....†1911  
 Associate Professor of Botany, Indiana University.  
 Plant Physiology, Botany.
- Arthur, Joseph C., 915 Columbia St., Lafayette.....1893  
 Professor Emeritus of Botany, Purdue University.  
 Botany.
- Badertscher, J. A., 312 S. Fess Ave., Bloomington.....1917  
 Professor of Anatomy, Indiana University.  
 Anatomy.
- Beede, Joshua W., 404 W. 38th St., Austin, Texas.....1906  
 Bureau of Economic Geology and Technology, University of  
 Texas.  
 Geology.
- Behrens, Charles A., 217 Lutz Ave., West Lafayette.....1917  
 Professor of Bacteriology, Purdue University.  
 Bacteriology.
- Bennett, Lee F., Janesville, Wis.....1916  
 With The H. W. Gossard Company.  
 Geology, Zoology
- Benton, George W., 100 Washington Square, New York, N. Y.....1896  
 Editor in Chief, American Book Company.
- Bigney, Andrew J., Syracuse, N. Y.....1897  
 Professor of Physiology, Syracuse University.
- Blanchard, William M., 1008 S. College Ave., Greencastle, Ind.....1914  
 Professor of Chemistry, DePauw University, Greencastle, Ind.  
 Organic Chemistry.
- Blatchley, W. S., 1558 Park Ave., Indianapolis.....1893  
 Naturalist.  
 Botany, Entomology, and Geology.

\* Every effort has been made to obtain the correct address and occupation of each member, and to learn in what line of science he is interested. The first line contains the name and address; the second line the occupation; the third line the branch of science in which he is interested. The omission of an address indicates that mail addressed to the last printed address was returned as uncalled for. Information as to the present address of members so indicated is requested by the secretary. The custom of dividing the list of members has been followed.

† Date of election.

Breeze, Fred J., Muncie.....	1910
Branch State Normal School.	
Geography.	
Bruner, Henry Lane, 324 S. Ritter Ave., Indianapolis.....	1899
Professor of Biology, Butler College.	
Comparative Anatomy, Zoology.	
Bryan, William Lowe, Bloomington.....	1914
President Indiana University.	
Psychology.	
Butler, Amos W., 52 Downey Ave., Irvington.....	1893
Secretary, Indiana Board of State Charities.	
Vertebrate Zoology, Anthropology, Sociology.	
Cogshall, Wilbur A., 423 S. Fess Ave., Bloomington.....	1906
Associate Professor of Astronomy, Indiana University.	
Astronomy.	
Coulter, Stanley, 213 S. Ninth St., Lafayette.....	1893
Dean School of Science, Purdue University.	
Botany, Forestry.	
Cox, Ulysses O., P. O. Box 81, Terre Haute.....	1908
Head Department Zoology and Botany, Indiana State Normal.	
Botany, Zoology.	
Culbertson, Glenn, Hanover.....	1899
Chair Geology, Physics and Astronomy, Hanover College.	
Geology.	
Cummings, Edgar Roscoe, 327 E. Second St., Bloomington.....	1906
Professor of Geology, Indiana University.	
Geology, Paleontology.	
Deam, Charles C., Bluffton.....	1910
Druggist, Botanist, State Forester.	
Botany.	
Dryer, Charles R., Oak Knoll, Fort Wayne.....	1897
Geography.	
Dutcher, J. B., 1212 Atwater St., Bloomington.....	1914
Associate Professor of Physics, Indiana University.	
Physics.	
Eigenmann, Carl H., 630 Atwater St., Bloomington.....	1893
Professor of Zoology, Dean of Graduate School, Indiana University.	
Embryology, Degeneration, Heredity, Evolution and Distribution of American Fish.	
Enders, Howard Edwin, 107 Fowler Ave., Lafayette.....	1912
Professor of Zoology, Purdue University.	
Zoology.	

Evans, Percy Norton, 302 Waldron St., West Lafayette.....	1901
Director of Chemical Laboratory, Purdue University.	
Chemistry.	
Foley, Arthur L., Bloomington.....	1897
Head of Department of Physics, Indiana University.	
Physics.	
Hessler, Robert, Logansport.....	1899
Physician.	
Biology.	
Hoffer, George N., Littleton St., West Lafayette.....	1913
Federal Agent, Purdue University Experiment Station.	
Hufford, Mason E., Bloomington.....	1916
Physics.	
Hurty, J. N., Indianapolis.....	1910
Secretary, Indiana State Board of Health.	
Hygiene and Chemistry.	
Hyde, Roscoe Raymond, 636 Chestnut St., Terre Haute.....	1909
Assistant Professor Physiology and Zoology, Indiana State	
Normal.	
Zoology, Physiology, Bacteriology.	
Kenyon, Alfred Monroe, 315 University St., West Lafayette.....	1914
Professor of Mathematics, Purdue University.	
Mathematics.	
Kern, Frank D., State College, Pa.....	1912
Professor of Botany, Pennsylvania State College.	
Botany.	
Koch, Edward W., Buffalo, N. Y.....	1917
Care of University of Buffalo Medical School.	
Pharmacology.	
Logan, Wm. N., 924 Atwater St., Bloomington.....	1917
Professor of Economic Geology, Indiana University.	
State Geologist.	
McBride, Robert W., 1239 State Life Building, Indianapolis.....	1916
Lawyer.	
Middleton, A. R., 629 University St., West Lafayette.....	1908
Professor of Chemistry, Purdue University.	
Chemistry.	
Morrison, Edwin, 80 S. W. Seventh St., Richmond.....	1915
Professor of Physics, Earlham College.	
Physics and Chemistry.	
Mottier, David M., 215 Forest Place, Bloomington.....	1893
Professor of Botany, Indiana University.	
Morphology, Cytology.	

Naylor, J. P., Greencastle.....	1903
Professor of Physics, DePauw University.	
Physics, Mathematics.	
Nieuwland, J. A.....	1914
Notre Dame University.	
Botany and Organic Chemistry.	
Payne, F., 620 S. Fess Ave., Bloomington.....	1916
Associate Professor of Zoology, Indiana University.	
Cytology and Embryology.	
Pohlman, Augustus G., 16 Yale Ave., University City, St. Louis, Mo.....	1911
Professor of Anatomy.	
Embryology, Comparative Anatomy.	
Ramsey, Rolla R., 615 E. Third St., Bloomington.....	1906
Associate Professor of Physics, Indiana University.	
Physics.	
Ransom, James H., 2015 West End Ave., Nashville, Tenn.....	1902
Professor of Chemistry, Vanderbilt University.	
General Chemistry, Organic Chemistry.	
Rettger, Louis J., 31 Gilbert Ave., Terre Haute.....	1896
Professor of Physiology, Indiana State Normal.	
Animal Physiology.	
Rothrock, David A., Bloomington.....	1906
Professor of Mathematics, Indiana University.	
Mathematics.	
Schockel, Barnard, Terre Haute.....	1917
Professor of Physical Geography, State Normal School.	
Scott, Will, Bloomington.....	1911
Assistant Professor of Zoology, Indiana University.	
Zoology, Lake Problems.	
Shannon, Charles W., 518 Lahoma Ave., Norman, Okla.....	1912
With Oklahoma State Geological Survey.	
Geology.	
Smith, Albert, University St., West Lafayette (Army Service).....	1908
Professor of Structural Engineering.	
Physics, Mechanics.	
Smith, Charles Marquis, 152 Sheetz St., West Lafayette.....	1912
Professor of Physics, Purdue University.	
Physics.	
Stone, Winthrop E., Lafayette.....	1893
President of Purdue University.	
Chemistry.	

- Van Hook, James M., 939 N. College Ave., Bloomington.....1911  
 Assistant Professor of Botany, Indiana University.  
 Botany.
- Wade, Frank Bertram, 1039 W. Twenty-seventh St., Indianapolis...1914  
 Head of Chemistry Department, Shortridge High School.  
 Chemistry, Physics, Geology, and Mineralogy.
- Williamson, E. B., Bluffton.....1914  
 President, The Wells County Bank.  
 Dragonflies.
- Woollen, William Watson, Indianapolis.....1908  
 Lawyer.  
 Birds and Nature Study.
- Wright, John S., 3718 N. Pennsylvania St., Indianapolis.....1894  
 Manager of Advertising Department, Eli Lilly Co.  
 Economic Botany.

---

*NON-RESIDENT MEMBERS AND FELLOWS.*

- Abbott, G. A., Grand Forks, N. Dak., Fellow.....1908  
 Professor of Chemistry, University of North Dakota.  
 Chemistry.
- Aldrich, John Merton, Washington, D. C.....1918  
 Custodian of Diptera, U. S. National Museum.  
 Dipterologist.
- Aley, Robert J., Orono, Me., Fellow.....1908  
 President of University of Maine.  
 Mathematics and General Science.
- Branner, John Casper, Stanford University, California.  
 President Emeritus of Stanford University.  
 Geology.
- Brannon, Melvin A., President Beloit College, Beloit, Wis.  
 Plant Breeding, Botany.
- Burrage, Severance, Denver, Colo.....1898  
 United States Public Health Work.
- Campbell, D. H., Stanford University, California.  
 Professor of Botany, Stanford University.  
 Botany.
- Clark, Howard Walton, U. S. Biological Station, Fairport, Iowa.  
 Scientific Assistant U. S. Bureau of Fisheries.  
 Botany, Zoology.
- Cook, Mel T., New Brunswick, N. J., Fellow.....1902  
 Plant Pathologist, New Jersey Experiment Station.  
 Botany, Plant Pathology, Entomology.

- Coulter, John M., University of Chicago, Chicago, Ill., Fellow . . . . .1893  
Head Department of Botany, Chicago University.  
Botany.
- Davis, B. M., Oxford, Ohio.  
Professor of Agricultural Education.  
Miami University.
- Duff, A. Wilmer, 43 Harvard St., Worcester, Mass.  
Professor of Physics, Worcester Polytechnic Institute.  
Physics.
- Evermann, Barton Warren, Director Museum.  
California Academy of Science, Golden Gate Park, San Francisco, Cal.  
Zoology.
- Gilbert, Charles H., Stanford University, California.  
Professor of Zoology, Stanford University.  
Ichthyology.
- Goss, William Freeman M., 61 Broadway, New York, Fellow . . . . .1893  
President The Railway Car Manufacturers Association.
- Greene, Charles Wilson, 814 Virginia Ave., Columbia, Mo.  
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Physiology, Zoology.
- Hargitt, Chas. W., 909 Walnut Ave., Syracuse, N. Y.  
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Hygiene, Embryology, Eugenics, Animal Behavior.
- Hay, Oliver Perry, U. S. National Museum, Washington, D. C.  
Research Associate, Carnegie Institute of Washington.  
Vertebrate Paleontology, especially that of the Pleistocene Epoch.
- Huston, H. A., New York City, Fellow . . . . .1893  
Secretary, German Kali Works.
- Jenkins, Oliver P., Stanford University, California.  
Professor of Physiology, Stanford University.  
Physiology, Histology.
- Jordan, David Starr, Stanford University, California.  
Chancellor Emeritus of Stanford University.  
Fish, Eugenics, Botany, Evolution.
- Kingsley, J. S., University of Illinois, Urbana, Ill.  
Professor of Zoology.  
Zoology.
- KleinSmid von, R. B., President University of Arizona, Tucson, Ariz.
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Professor of Experimental Physics, University of Illinois.  
Physics, Discharge of Electricity Through Gases.

- Marsters, V. F., Kansas City, Mo., care of C. N. Gould, Fellow....1893  
Geologist.
- McDougal, Daniel Trembly, Tucson, Ariz.  
Director, Department of Botanical Research, Carnegie Institute,  
Washington, D. C.  
Botany.
- McMullen, Lynn Banks, State Normal School, Valley City, N. D.  
Head Science Department and Vice-President State Normal  
School.  
Physics, Chemistry.
- Mendenhall, Thomas Corwin, Ravenna, O.  
Retired.  
Physics, "Engineering," Mathematics, Astronomy.
- Miller, John Anthony, Swarthmore, Pa., Fellow.....1904  
Professor of Mathematics and Astronomy, Swarthmore College.  
Astronomy, Mathematics.
- Moore, George T., St. Louis, Mo.  
Director Missouri Botanical Garden.  
Botany.
- Noyes, William Albert, Urbana, Ill., Fellow.....1893  
Director of Chemical Laboratory, University of Illinois.  
Chemistry.
- Reagan, A. B.  
Superintendent Deer Creek Indian School, Ibopah, Utah.  
Geology, Paleontology, Ethnology.
- Smith, Alexander, care Columbia University, New York, Fellow....1893  
Head of Department of Chemistry, Columbia University.  
Chemistry.
- Springer, Alfred, 312 E. Second St., Cincinnati, O.  
Chemist.  
Chemistry.
- Swain, Joseph, Swarthmore, Pa., Fellow.....1898  
President of Swarthmore College.  
Science of Administration.
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Mathematics, Mechanics, Geology and Mineralogy.
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Professor of Agricultural Chemistry, George Washington Uni-  
versity.  
Biological and Agricultural Chemistry.
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Zoology.

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- Baker, William Franklin, Indianapolis, care St. Vincent's Hospital.  
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- Barnhill, Dr. T. F., Indianapolis.  
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Professor of Mathematics, Chicago Technical College.  
Mathematics.
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Medicine, State School for Feeble Minded.
- Blose, Joseph, Spiceland.  
Physics.
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Biology, Bacteriology, Physical Diagnosis and Photomicrography.
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Farmer.  
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Medicine.
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Professor of Physics, Valparaiso University.  
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Chemistry, Experiment Station.
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Columbia University.  
Geology.

- Cromwell, Hobart, Salem, Ind.  
Zoology.
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- Daniels, Lorenzo E., Rolling Prairie.  
Retired Farmer.  
Conchology.
- Dean, John C., University Club, Indianapolis.  
Astronomy.
- Denny, Martha L., Manhattan, Kan.  
Kansas Agricultural College.  
Zoology.
- Deppe, C. A., Franklin.  
Franklin College.
- Dietz, Harry F., Washington, D. C.  
Federal Horticultural Board.  
Entomology.
- Doan, Martha, Richmond.  
Professor of Chemistry, Earlham.
- Dolan, Jos. P., Syracuse.
- Douglas, Benjamin W., Trevlac.  
Fruit Culture.
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Zoology and Botany, Teachers College.
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Paleontology and Ecology.
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Purdue University.  
Engineering.
- Earp, Samuel E., 643 Occidental Bldg., Indianapolis.  
Physician.  
Medicine.
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Graduate Student, Physiology, Indiana University.  
Physiology.
- Emerson, Charles P., 602 Hume-Mansur Bldg., Indianapolis.  
Dean Indiana University Medical College.  
Medicine.
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Assistant in Dairy Chemistry, Experiment Station, Purdue University.

- Estabrook, Arthur H., 219 E. 17th St., Indianapolis.  
Genetics, with State Board of Charities.
- Evans, Samuel G., 1452 Upper Second St., Evansville.  
Merchant.  
Botany, Ornithology.
- Felver, William P., 325½ Market St., Logansport.  
Railroad Clerk.  
Geology, Chemistry.
- Fisher, Homer Glenn, Johns Hopkins Medical School, Baltimore, Md.  
Student in Medicine.
- Fisher, L. W., Rossville.  
Zoology.
- Fisher, Martin L., Lafayette.  
Professor of Crop Production, Purdue University.  
Agriculture, Soils, Crops, Birds, Botany.
- Foresman, George Kedzie, 110 S. Ninth St., Lafayette.  
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Experiment Station.  
Chemistry, Nutrition.
- Funk, Austin, 519 E. Ninth St., New Albany.  
Physician.  
Diseases of Eye, Ear, Nose and Throat.
- Galloway, Jesse James, Geology Department, Columbia University, New York City.  
Geology, Paleontology.
- Gatch, Willis D., Indianapolis, Indiana University Medical School.  
Professor of Surgery.
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Teacher of Botany.  
Botany and Zoology.
- Gidley, William, 250 Hillside Ave., Jamaica, N. Y.  
Pharmacy, with E. R. Squibb & Sons, New York.
- Gillum, Robert G., Terre Haute.  
State Normal School.
- Gingery, Walter G., Shortridge High School, Indianapolis.  
Mathematics.
- Glenn, Earl R., New York City.  
The Lincoln School of Teachers College, Columbia University.  
Physics.
- Goldsmith, William Morton, Gunnison, Colo.  
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Surgery.
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Botany.
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Physiology.
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- Hemmer, Edwin John, Somerville.  
Botany.
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Civil Engineering and Wood Preservation.
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Medicine, Surgery, X-Ray, Electro-Therapeutics.
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Board of Health.  
Chemistry and Biology.
- Hoffman, George L., care of Western Pennsylvania Hospital, Pitts-  
burgh, Pa.  
Bacteriology, Serology.
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Chemistry and Physics.
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Hanover College.  
Chemistry and Biology.
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Zoology.
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Geology.
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Nature Study.
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Biology, Purdue University.
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High School Teacher.  
Geology.
- Ludwig, C. A., R. R. 1, Brookville.  
Agriculture, Botany.
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Plant Pathology and Mycology.
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- McKinley, Lester, Bloomington.  
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Entomology.
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Mechanical Engineering.
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Assistant Plant Physiology, Experiment Station, University of  
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Research Chemist and Bacteriologist.
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Biology.
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Botany and Bacteriology.
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Geology.
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Plant Pathology.
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Professor of Biology. (Retired.)  
Biology.
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Chemistry.
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Botany, University of Michigan.  
Botany, Plant Breeding, Plant Pathology, Bio-Chemistry.
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Botany.
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Biology and Agriculture.
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- Ramsey, Glenn Blaine, Orono, Me.  
Botany.
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Professor of Zoology, Wabash College.
- Richards, Mrs. Mildred Hoge, 307 E. Jefferson St., Crawfordsville.  
Zoology.
- Rifenburgh, S. A., Valparaiso, Ind.  
Instructor Botany, Valparaiso University.  
Botany.
- Riley, Katherine, Robert W. Long Hospital, Indianapolis.
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Roxana Petroleum Company.  
Petroleum Geologist.
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Agricultural Botany, Purdue University.

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Mammalogy.
- Showalter, Ralph W., Indianapolis.  
Director Biological Department, Eli Lilly & Co.  
Biology.
- Silvey, Oscar W., College Station, Texas.  
Physics, University of Texas.
- Smith, Chas. Piper, Hyattsville, Md.  
State Seed Inspection Officer.  
Systematic Botany.
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U. S. Bureau of Entomology, Extension Division.  
Entomology.
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- Stoltz, Charles, 530 N. Lafayette St., South Bend.  
Physician.
- Stone, Ralph Bushnell, 307 Russell St., West Lafayette.  
Mathematics, Purdue University.
- Sulzer, Elmer G., Madison.  
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Student in University of Wisconsin.
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Professor of Physiology, Purdue University.
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- Thompson, Clem O., 105 N. High St., Salem.  
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Biology.
- Thornburn, A. D., Indianapolis, care Pitman-Moore Company.  
Chemistry.
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Botany, Plant Physiology and Pathology.
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- Williams, A. A., Valparaiso.  
Mathematics, Valparaiso University.  
Mathematics, Astronomy.
- Wilson, Charles E., Brazil.  
Zoology and Economic Entomology.

- Wilson, Mrs. Etta L., 2 Clarendon Ave., Detroit, Mich.  
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- Young, Gilbert A., 739 Owen St., Lafayette.  
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- Zehring, William Arthur, 303 Russell St., West Lafayette.  
Assistant Professor of Mathematics, Purdue University.  
Mathematics.

Fellows .....	58
Members, Active .....	186
Members and Fellows, Non-resident.....	38
	—
Total .....	282

MINUTES OF THE SPRING MEETING.  
INDIANA ACADEMY OF SCIENCE.

MAY 24 AND 25, 1918.

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The Illinois Academy of Science joined the Indiana Academy of Science in its Spring Meeting on Friday and Saturday, May 24 and 25, 1918, in the new State Park, Turkey Run, in Parke County, and at The Shades, in Montgomery County. Seventy-two members and guests of the two Academies were in attendance at the meeting.

Touring parties were organized at the park entrance under competent guides as groups of individuals arrived by automobile. They devoted the forenoon of Friday to exploring the magnificent forest, the rugged trails, picturesque ravines and the watercourses of the park. A basket-luncheon at noon afforded opportunity to renew old acquaintances and to make new ones among kindred spirits.

After luncheon the groups were reassembled for the trip across the swaying suspension bridge and a tramp into Rocky Hollow to the rugged, moss-covered gorges where giant kettle-holes and eroded or broken rocks indicate, of the past, a rush of water quite out of proportion to the amount that now trickles over the same ledges on its way into Sugar Creek. Enthusiastic groups of individuals explored the narrow ravines and slippery trails to study the geological formations or to try the cool waters of an isolated kettle-hole.

About four o'clock a long procession of automobiles carried the Academy party over the intervening fifteen miles of rugged country covered with magnificent forests and beautiful streams to The Shades, where dinner was provided in the spacious dining-room of The Shades Hotel. The freedom of the park was extended through the courtesy of Mr. Frisz, the proprietor and manager.

A general session of the Academies was held in the grove after the dinner.

The broad verandas and beautiful grove about the hotel afforded opportunity for further visiting until long after the more sedate members had gone into slumber-land.

SATURDAY, MAY 25, 1918.

After breakfast at The Shades Hotel, tramping-parties were quickly organized to explore the beauties of The Shades Park, the waterfalls and eroded ravines, the Devil's Punchbowl and other geological for-

mations of unusual interest. The fantastic shapes of rocks seem to have appealed to some imaginative soul who believed they could have had no use but to the devil, therefore ascribed them to his satanic majesty as articles of domestic use. The Devil's Backbone then became the objective point of others who followed the narrow, beaten trail along Sugar Creek to the interesting high ridge of exposed rocks that bears this name. The return to the hotel afforded opportunity to see the points of interest that had been missed on our way. After a hearty luncheon and a brief exchange of experiences the groups dispersed with the feeling that the 1918 Spring Meeting had brought a new outlook and new experiences.

The following members of the Illinois and Indiana Academies and their guests attended the Spring Meeting:

Flora Anderson, Bloomington.  
W. S. Bayley, Urbana, Ill.  
Mrs. W. S. Bayley, Urbana, Ill.  
Miss E. E. Bayley, Urbana, Ill.  
C. A. Behrens, West Lafayette.  
Elliot Blackwalder, Urbana, Ill.  
Mrs. Elliot Blackwalder, Urbana, Ill.  
W. S. Blatchley, Indianapolis.  
F. J. Breeze, Terre Haute.  
Edwin M. Bruce, Terre Haute.  
Stanley Coulter, Lafayette.  
Ulysses O. Cox, Terre Haute.  
Mrs. Kate Meehan Cox, Terre Haute.  
M. K. Davis, Terre Haute.  
Mrs. Davis, Terre Haute.  
Chas. C. Deam, Bluffton.  
Chas. S. Driver, Bloomington.  
Howard E. Enders, West Lafayette.  
Arthur L. Foley, Bloomington.  
Mrs. Loretta Foley, Bloomington.  
L. W. Fisher, West Lafayette.  
M. L. Fisher, West Lafayette.  
W. G. Gingery, Indianapolis.  
W. F. Gidley, West Lafayette.  
Richard M. Holman, Crawfordsville.  
Geo. N. Hoffer, West Lafayette.  
H. S. Jackson, West Lafayette.  
L. E. Kennedy, Urbana, Ill.  
Chas. T. Knipp, Urbana, Ill.  
Mrs. Knipp, Urbana, Ill.

Miss Knipp, Urbana, Ill.  
P. L. Knipp, Urbana, Ill.  
Wm. A. McBeth, Terre Haute.  
Mrs. Wm. McBeth, Terre Haute.  
J. W. McCarty, Lafayette.  
Eula D. McEwan, Washington, D. C.  
M. S. Markle, Richmond.  
A. R. Middleton, West Lafayette.  
C. F. Miller, Urbana, Ill.  
W. J. Moenkhaus, Bloomington.  
Edwin Morrison, Richmond.  
W. A. Noyes, Urbana, Ill.  
Mrs. Noyes, Urbana, Ill.  
F. Payne, Bloomington.  
Burr N. Prentice, West Lafayette.  
R. R. Ramsey, Bloomington.  
Mrs. Clara Ramsey, Bloomington.  
R. D. Reed, Urbana, Ill.  
A. Richards, Crawfordsville.  
Mildred H. Richards, Crawfordsville.  
Katherine Riley, Indianapolis.  
R. D. Salisbury, Chicago, Ill.  
Will Scott, Bloomington.  
Mrs. E. L. Stevens, St. Louis, Mo.  
Charles Stoltz, South Bend.  
W. E. Stone, West Lafayette.  
Mrs. Stone, West Lafayette.  
Oliver P. Terry, West Lafayette.  
Mrs. O. P. Terry, West Lafayette.  
P. A. Tetrault, West Lafayette.  
Emma L. Tevis, Indianapolis.  
W. Tomlinson, Urbana, Ill.  
E. H. Toole, West Lafayette.  
Frank B. Wade, Indianapolis.  
Mrs. F. B. Wade, Indianapolis.  
L. D. Waterman, Indianapolis.  
John S. Wright, Indianapolis.  
—— Wright, Indianapolis.  
Frank B. Wynn, Indianapolis.  
Mrs. F. B. Wynn, Indianapolis.  
Charles Zeleny, Urbana, Ill.

BUSINESS MEETING AND GENERAL SESSION, FRIDAY, MAY 24, 1918.

A business meeting of the Indiana Academy of Science and a general meeting of the Indiana and Illinois Academies of Science was called to order by the Vice-President, Dr. Charles Stoltz, in the grove near The Shades Hotel.

The Membership Committee proposed the following names of persons for membership:

Harlan Q. Acre, Shoals, Botany.

Walter G. Gingery, Indianapolis, Mathematics.

Howard M. Lahr, Markle, Botany and Chemistry.

On motion, duly passed, they were elected to membership in the Indiana Academy of Science.

On motion the reprints from the Proceedings are to have the imprint of the volume, date of publication, and paging of the issue from which they are taken.

The matter is referred to the Publication Committee with power to act.

On motion the Secretary is ordered to telegraph President E. B. Williamson an expression of keen regret in his absence from the Spring Meeting, and to extend greetings and best wishes of the Academy for his speedy recovery to good health.

Vice-President Stoltz then appointed Stanley Coulter to take charge of the informal meeting that followed and to call upon various persons for addresses.

Dr. Coulter gave a brief history of the Indiana Academy of Science and its relation to the scientific activities of the State. He expressed our appreciation of the presence of so large a number from the Illinois Academy, and pointed out that a number of these persons formerly were members of the Indiana Academy and had an important part in its early achievements and activities.

A number of persons then were called upon to speak.

Dr. Frank B. Wynn of Indianapolis: "Why I am a pathologist rather than a naturalist." He pointed out the force of *curiosity* in the life of the investigator, and by means of a number of striking examples emphasized the fact that curiosity is a driving power in achievement.

Doctor W. A. Noyes of the University of Illinois expressed pleasure of the opportunity to attend this meeting and to renew acquaintances in the Indiana Academy of Science, of which he was a charter member. He spoke of the early years of the Academy and of its influence in academies and institutions of the country.

John S. Wright of Indianapolis spoke on the needs of an endowment for the promotion and publication of research in the Academy. A por-

tion of this endowment very properly should come from the State. The effect of the war upon the matter of giving will mean much for the financial future of the Academy.

Doctor R. D. Salisbury of the University of Chicago, representing the Illinois Academy of Science, spoke on: "The effect of the war to bring about a revaluation of the things which we have regarded as unimportant." The academies of science, represented by their chemists, physicists, biologists, and others, are interested in the public health of the army at home and in the service. Geologists have been used by our enemies to aid in a determination of the nature and kind of trenching, the tools required, etc., and the water supply for any given region. Our government has come to realize the service which its scientists in every branch may perform, and it is to be hoped that enlarged support of scientific work by the government will come as a result of such revaluation of the services of science.

Professor M. L. Fisher of Purdue University reported for the bird-study group that fifty-five species of birds had been observed during the day.

Professor Wm. McBeth of the State Normal School, Terre Haute, discussed the geological formations in the State Park, at Turkey Run, and outlined the chief points of interest in the geology of The Shades Park.

Professor S. H. Jackson of the Agricultural Experiment Station, Purdue University, reported on the species of rusts found, and made a special appeal for the eradication of the barberry, the intermediate host of our destructive grain rust. He urged the importance of its eradication as a war-measure that is being undertaken by every State in the Union.

Miss Flora Anderson, student in zoology in Indiana University, reported upon the number of snakes observed or collected during the day.

A rising vote of thanks was tendered Mr. J. W. Frisz, manager and proprietor of The Shades Park, for his numerous courtesies and the freedom of the park.

Adjournment.

CHARLES STOLTZ, Vice-President.  
HOWARD E. ENDERS, Secretary.



FRIDAY, 8:30 P. M.

Assembly Room, Claypool Hotel.

Symposium on Important Contributions of Science to Military Efficiency.

*Leaders.*

For Astronomy.....	Prof. W. A. Cogshall, Indiana University
For Bacteriology.....	Dr. Will Shimer Director State Laboratory of Hygiene
For Botany.....	Prof. R. M. Holman, Wabash College
For Chemistry.....	F. R. Eldred Director of Scientific Department, Eli Lilly & Co., Indianapolis
For Geology.....	Prof. L. F. Bennett, Valparaiso University
For Physics.....	Prof. Chas. M. Smith, Purdue University
For Physiography...Prof. W. A. McBeth, Indiana State Normal School	
For Zoology.....	Prof. H. L. Bruner, Butler College

SATURDAY.

Business Session .....9 a. m.

## GENERAL SESSION.

FRIDAY 10:00 A. M.

1. The Proposed Conservation Bill—Governor Goodrich. To be given on arrival of Governor Goodrich.
2. The Barberry and Its Relation to the Stem Rust of Wheat in Indiana, 20 minutes—F. J. Pipal, Purdue University.
3. Evolutionary Philosophy and the German War—A. Richards, Wabash College.
4. Geography in Colleges and Universities of the United States, 20 minutes—F. J. Breeze, Indiana State Normal School.
5. The Life of the Late Dr. Luther D. Waterman—A. L. Foley, Indiana University.
6. In Memoriam, Prof. Geo. D. Timmons—L. F. Bennett, Valparaiso University.
7. Biography of the Scientific Work of William James Jones, Jr.—S. D. Conner, Associate Chemist, Agricultural Experiment Station, Purdue University.
8. Observations on 1,500 Registrants of the First Conscription, 30 minutes—Dr. Chas. Stoltz, South Bend.

9. Mental Defectives; the Problem; Conditions in Indiana, 20 minutes—Miss Edna R. Jatho, Psychologist, Philadelphia Public Schools.
10. Textbook Treatments of Diffusion and Osmosis, 15 minutes—Paul Weatherwax, Indiana University.

CONTINUATION OF GENERAL SESSION, FOLLOWED BY  
SECTIONAL MEETINGS.

FRIDAY 2:00 P. M AND SATURDAY 9:30 A. M.

*Bacteriology.*

11. Number of Colonies for a Satisfactory Soil Plate—H. A. Noyes and G. L. Grounds, Agricultural Experiment Station, Purdue University.
12. The Length of Time to Incubate Petri Plates—H. A. Noyes, J. D. Lockett and Edwin Voigt, Agricultural Experiment Station, Purdue University.
13. Bacteria in Frozen Soil—H. A. Noyes, Agricultural Experiment Station, Purdue University.

*Botany.*

14. Reproduction in *Coleochaete Scutata*, 8 minutes (lantern)—M. S. Markle, Earlham College.
15. Some Abnormalities in Plant Structure, 2 minutes—M. S. Markle, Earlham College.
16. Plants of Boone County, Kentucky (by title)—James C. Nelson.
17. Plants New or Rare to Indiana, VIII, 10 minutes—Chas. C. Deam, Acting State Forester.
18. The Morphological Basis of Certain Problems in Inheritance in Maize, 12 minutes—Paul Weatherwax, Indiana University.

*Chemistry.*

19. Analysis of 100 Soils in Allen County, Indiana—R. H. Carr and V. R. Phares, Purdue University.
20. Relation of Nitrogen, Phosphorus and Organic Matter to Corn Yield in Elkhart County, Indiana—R. H. Carr and LeRoy Hoffman, Purdue University.
21. Flame Reactions of Thallium, 10 minutes—Jacob Papish, Purdue University.
22. Sulphur Dioxide as a Source of Volcanic Sulphur, 5 minutes—Jacob Papish, Purdue University.

*Geology.*

23. A Preliminary Report on the Origin of Indianaite in Indiana, 10 minutes—Wm. N. Logan, Indiana University.
24. The Occurrence of Coal in Monroe County, Indiana, 5 minutes—Wm. N. Logan, Indiana University.
25. The Occurrence of Indianaite in Monroe County, Indiana, 5 minutes—Wm. N. Logan, Indiana University.
26. Notes on the Paleontology of Certain Chester Formations in Southern Indiana, 10 minutes—Allen D. Hole, Earlham College.
27. Soil Survey of Cass County, 10 minutes—Colonzo C. Beals, Indiana University.

*Physics.*

28. A New Method of Measuring the Velocity of Sound, 15 minutes (lantern)—A. L. Foley, Indiana University.
29. The Instantaneous Velocity of Sound at Points Near the Source, 5 minutes (lantern)—A. L. Foley, Indiana University.
30. An Experimental Determination of the Relation Between Sound Velocity and Intensity, 5 minutes (lantern)—A. L. Foley, Indiana University.
31. An Experimental Determination of the Duration and Luminosity of an Electric Spark, 10 minutes (lantern)—A. L. Foley, Indiana University.
32. A Simple Method of Determining the Character and Frequency of the Oscillation of Machine Parts, 5 minutes (lantern)—A. L. Foley, Indiana University.
33. Energy Losses in Commercial Hammers, 5 minutes—Edwin Morrison, Earlham College.
34. New Surface Tension Apparatus, 5 minutes (lantern)—Edwin Morrison, Earlham College.
35. Effect of Certain Dissolved Salts Upon the Surface Tension of Water, 10 minutes (lantern)—Edwin Morrison, Earlham College.

*Physiography.*

36. The Chester Series of Indiana and Their Correlation with Those of Kentucky, 10 minutes—Clyde A. Malott and James D. Thompson, Jr.
37. A Peculiar and Remarkable Adjustment of Drainage—the Case of "The American Bottoms" of Greene County, Indiana, 10 minutes—Clyde A. Malott and Frederick J. Breeze.
38. A Notable Case of Successive Stream Piracy, 10 minutes—Clyde A. Malott.

39. Monadnocks and Similar Physiographic Features, 10 minutes—Clyde A. Malott.
40. A New Explanation of the Valley Filling of Southwestern Indiana and Associated Regions, 10 minutes—Clyde A. Malott.

*Zoology.*

41. The Crustaceans of Lake Maxinkuckee—Barton W. Evermann, Director of the Museum of the California Academy of Sciences, and Howard W. Clark, Scientific Assistant, U. S. Bureau of Fisheries Biological Station, Fairport, Iowa; 20 minutes.
42. The Insects of the Lake Maxinkuckee Region—Barton W. Evermann, Director of the Museum of the California Academy of Sciences, and Howard W. Clark, Scientific Assistant, U. S. Bureau of Fisheries, Biological Station, Fairport, Iowa.
43. Aphids on Fruit Trees, 5 minutes—S. D. Conner, Associate Chemist, Agricultural Experiment Station, Purdue University.
44. Some Further Experiments for Low and High Bristle Number in a Mutant Strain of *Drosophila Ampelophila*, 10 minutes—F. Payne, Indiana University.
45. A Memorial, Albert Homer Purdue—George H. Ashley, Washington, D. C.
46. A Memorial, Prof. M. J. Golden—R. B. Trueblood, Purdue University.
47. Some Trees of Indiana—F. M. Andrews, Indiana University.
48. Ascomycetes New to the Flora of Indiana—Bruce Fink and Sylvia C. Fuson, Miami University.
49. The Dormant Period of Timothy Seed After Harvesting—M. L. Fisher, Purdue University.
50. The Birds of the Sand Dunes of Northwestern Indiana—C. W. G. Eifrig, Oak Park, Ill.
51. A Synopsis of the Races of the Guina Flycatcher—Harry C. Oberholser, the U. S. National Museum.
52. Erosional Freaks of the Saluda Limestone—Elmer G. Sulzer, Madison.
53. Remnant Monuments Near Madison—Elmer G. Sulzer, Madison.
54. A Kinetic Model of the Electron Atom—R. R. Ramsey, Indiana University.
55. New Methods of Measuring the Speed of Sound Pulses Near the Source—Arthur L. Foley, Indiana University.

MINUTES OF THE FALL MEETING,  
INDIANA ACADEMY OF SCIENCE,

CLAYPOOL HOTEL, INDIANAPOLIS, IND., DECEMBER 7, 1918.

The Executive Committee of the Indiana Academy of Science met at the Claypool Hotel and was called to order by the President, E. B. Williamson. The following members were present: F. M. Andrews, L. F. Bennett, Wm. Blanchard, A. W. Butler, W. Cogshall, S. Coulter, C. C. Deam, R. W. McBride, J. P. Naylor, C. Stoltz, P. A. Tetrault, F. B. Wade, E. B. Williamson and J. S. Wright.

The reports of the standing committees were first taken up.

*Program Committee*—Oral reports by C. C. Deam and F. B. Wade. On account of the influenza epidemic, the printed report was not carried out, but all papers submitted will be printed in the regular Proceedings.

*Committee on Biological Survey*—Written report submitted to the President by the Chairman, H. S. Jackson, was read by the Secretary. A number of investigations are in progress, and it is hoped that the work under way will be in shape for publication in the Proceedings of the Academy at an early date.

*Committee on Distribution of Proceedings*—Due to the absence of the Chairman, H. E. Enders, the report was given by Wm. Blanchard. The delay in the distribution of the Proceedings was explained.

*Committee on Amendments*—Work being completed, the committee was discharged.

*Committee on Relation of Academy to State*—On motion a special committee of five was appointed by the President, the President acting as Chairman, to consider the publication of the Evermann Report on the Biology of Lake Maxinkuckee.

Adjourned at 1:00 p. m. for luncheon.

Meeting reopened at 2:00 p. m.

On motion a committee was appointed to confer with the Senator and Representative appointed by the Governor to frame the bill for the naming of a Conservation Commission. The object is to have the following embodied in the bill:

Three men appointed from each of the following institutions: Indiana Academy of Science, Indiana Horticultural Society, Indiana Sportsmen's

Association, the higher institutions of the State, including universities, colleges and normal schools, who shall constitute a committee to nominate the director of the commission.

The following committee was appointed by the President: R. W. McBride, J. S. Wright, F. B. Wynn, W. Cogshall, S. Coulter.

Wm. M. Blanchard, Treasurer, reported as follows:

Balance in treasury December 2, 1917.....	\$524 58
Dues collected during the year.....	224 00
	_____
Total .....	\$748 58
Expenditures .....	286 51

Balance in treasury December 1, 1918.....	\$462 07
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The report was received and referred to the Auditing Committee.

The Membership Committee proposed the following names of persons for membership:

Frank G. Bates, 908 E. Atwater Ave., Bloomington—Political Science.

Walter W. Bonns, care of Eli Lilly & Co., Indianapolis—Plant Physiology.

Edgar Brock Carter, 2615 Ashland Ave., Indianapolis—Chemistry and Bacteriology.

Frank R. Eldred, 3325 Kenwood Ave., Indianapolis—Chemistry.

Harold Gray, 2813 Ruckle St., Indianapolis—Chemistry.

Aubrey Chester Grubb, 427 Russell St., West Lafayette—Chemistry.

Jas. Wm. Jackson, Shortridge High School, Indianapolis—Chemistry.

John C. Jopling, 421 —. Emerson Ave., Indianapolis—Chemistry.

Daniel B. Luten, 1056 Lemcke Annex, Indianapolis—Civil Engineering.

Thomas E. Nicholson, N. Park Ave., Bloomington—Psychology.

Mrs. L. W. Pressey, N. Park Ave., Bloomington—Psychology.

S. L. Pressey, N. Park Ave., Bloomington—Psychology.

Paris Stockdale, 425 S. Grant St., Bloomington—Geology.

Elmer G. Sulzer, Madison—Geology.

Myron W. Tatlock, Shortridge High School, Indianapolis—Physics and Chemistry.

David H. Thompson, Dayton—Biology.

E. A. Wildman, care of Eli Lilly & Co., Indianapolis—Chemistry.

*Committee on Academy Foundations*—The report was laid on the table.

*Printing Committee*—Report was accepted, and on motion the Editor's bill is to be included in this year's expenses.

Professor J. M. Aldrich was elected a Fellow of the Academy.

On motion Professor J. M. Aldrich's name was transferred to the non-resident list.

On motion it was decided that only paying Fellows and members, both resident and non-resident, are to receive the Proceedings.

On motion the Secretary and Treasurer are instructed to nominate Fellows and members to be placed on the non-resident list, such Fellows and members to be chosen from those who remain in active scientific work. These same are to be voted on at the regular meeting of the Executive Committee, subject to the approval of the Academy.

*Nominating Committee*—The report of the committee was to the effect that the present officers should continue in office till the next regular meeting. The canceling of the annual meeting of the Academy has brought about conditions which make it impossible to hold an election at this time.

Adjourned 3:45 p. m.

E. B. WILLIAMSON, President.

P. A. TETRAULT, Assistant Secretary.